MERCER COUNTY COMMUNITY COLLEGE
MATH, SCIENCE AND HEALTH PROFESSIONS DIVISION
COURSE OUTLINE

BIO 201 General Microbiology

Fall 2025

Course Coordinator: Professor D.N. Hilker
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Course Website: http://www.mccc.edu/~hilkerd

4	3	3
Credit Hours	Lecture Hours	Laboratory Hour

Required Texts/Laboratory Items:

1. Microbiology, by Tortora, et.al.
   Pearson Co., 14th Edition, 2023
   ISBN-13: 9780138200398

2. BIO201 General Microbiology Lecture Notes, by D.N. Hilker
   MCCC Book Store, 5th Edition

3. Laboratory Experiments in General Microbiology, by D.N. Hilker
   Stipes Publishing Co., 7th Edition. Only carried by MCCC Bookstore (6th edition is acceptable)

4. Print laboratory lecture notes before each lab. Notes can be found on the course website located at **http://www.mccc.edu/~hilkerd/ OR** can be purchased under Optional Texts.

Note: This class will be held in person at the West Windsor campus. It will NOT be offered online.

Optional Texts:

1. BIO201 General Microbiology Laboratory: Laboratory Experiment Lecture Notes, by Prof. Hilker (5/2019) or they can be printed from the website (refer to #4 above)

Catalog Description:
The study of the morphology, taxonomy and metabolism of microbes with emphasis on fungi, protozoa, helminths, viruses and bacteria. Review of role of microbes in nature and their industrial application and medical importance. The laboratory portion of the course stands alone and is essentially a complete and separate course by itself and will include mini-lectures.

Prerequisites: Successful completion of BIO 101 or BIO 103 (grade of C or better) or consent of instructor

Note: Participation in Biology laboratory courses is permitted provided the student has completed the required prerequisites, is a minimum of 16 years of age or by permission of the instructor and the division Dean.

Grading: Note-Blackboard is unable to calculate the final course grade.
Lecture: 75% of total course grade

1. There will be a total of 5 exams given in the course. **All exams count-no exam grades are dropped!!!** Exams will count 70%. Students who are unable to be present for a scheduled exam and have an excused absence must contact the instructor prior to the exam. No call or no show to any exam will result in a zero for that exam. In the case where a student misses an exam, an alternate exam may be administered at the discretion of the instructor at the end of semester.

2. **Class Assignments:** There will be 10 Class Assignments given on Blackboard with each worth 10 pts (100 points total). They are to be submitted individually without collaboration with fellow classmates. Use your notes from the lecture Power Point presentations. Don't use outside resources (including AI); use your lecture notes. **Answers that have come from outside resources will not receive any credit and may be reported to the college's Academic Integrity Committee.** All of the answers are found in your lecture notes. Use them! There are no make-up assignments if not completed by the designated date. Class Assignments count 5% of your grade.

Laboratory: 25% of total course grade

1. There will be a total of **11 laboratory quizzes (10 points each)** counting **90%** of your laboratory grade. The lowest quiz will be dropped and the best 10 quiz grades will be counted in the laboratory grade. **There are no make-up quizzes if you miss a lab quiz. Quizzes are given at the start of lab. If you are late to lab, you miss the quiz.**

2. Each student will be given an **unknown microorganism** that they will try to identify. Correct identification (written laboratory report required) will result in an additional 10 points and will count **10% of your laboratory grade**. Failure in **attempting or completing** the unknown project will result in a zero for the entire laboratory portion of the course. The students' performance will also be constantly evaluated by the laboratory instructor.

Students are not allowed to miss more than 2 labs or it may result in them failing the course. With instructor approval, missed labs can be made-up during the week of the absence by attending other scheduled labs that week.

Final Course Grade (Note: Blackboard is not able to calculate a final BIO201 course grade)
In summary, the computation of the final course grade is as follows:

Lecture: 1. Sum of 5 exams /5 x 70%
2. Sum of 10 Class Assignments x 5%

Laboratory:
1. Sum of 10 best lab quizzes x 90% } x 25%
2. Additional 10pts if unknown identified }

For example:

Lecture:	1.	Sum of 5 exams	= 400 pts.
	2.	Sum of 10 assignments	= 96 pts. (100 pts. max)

Laboratory: Sum of 10 best lab quizzes = 80 pts. x 0.90 = 72 pts.
Correct unknown identified = 10 pts.

- $\frac{400 \text{ pts.}}{5}$ x .70 = 56 pts.
- 96 pts. x 0.05 = 4.8 pts.
- (72 pts. + 10 pts.) x .25 = 20.5 pts.
  Total = 81.3 pts. = B^-

Course Grading:

A = 93-100	C^+ = 77-79
A^- = 90-92	C = 70-76
B^+ = 87-89	D = 60-69
B = 83-86	F = 0-59
B^- = 80-82	

Microbiology Laboratory: The laboratory involves students working with microorganisms using proper safety precautions. Students should assume that these microbes have the potential to cause disease if they are not handled properly or if the student is immunocompromised. If you have a predisposing medical condition, please consult with your physician about taking this class. A list of microbes used in the laboratory can be provided upon request.

Lecture Attendance: Students are expected to attend class unless are they are ill or have an excused reason for not attending. If you are unable to attend, please inform the instructor of your absence. An attendance sheet will be circulated in lecture. Please print your name and only your name.

Voice-overs of the lectures from 2020 (13th ed. of the Textbook) are found in Blackboard and are NOT meant to replace attending the lecture but to reinforce the material covered in the classroom. Topics may be discussed in-class that are NOT on the Voice-over since the PPT notes have been updated using the 14th edition of the Textbook. Excessive (30% or more) lecture absences may result in a lower course grade by the instructor.

Mercer's Academic Integrity Policy

Any student who: a) knowingly represents work of others as his/her own; b) uses or obtains unauthorized assistance in the execution of any academic work; or c) gives fraudulent assistance to another student is guilty of cheating. **Violators will be penalized in accordance with established college policies and procedures and be given a zero grade for that assignment.**

Your examination should reflect your work and knowledge alone. You may not use **any** outside help, written or oral. You may not use notes of any sort; nor exchange papers, comments or gestures with classmates. Such an exchange of information constitutes cheating. You are just as guilty of cheating **giving** information to a person as is the person **receiving** it. Any observed instance of cheating is punishable by confiscation of the examination papers and being assigned a grade of zero for the examination. This applies equally to the giver and receiver of information. Cheating may result in a student being removed from the course and/or being reported to the Academic Integrity Committee for possible academic probation or dismissal. Be careful not to give the **appearance** of cheating. Keep your eyes to yourself. Keep your papers right in front of you so they cannot be seen by the people to either side of you or the person behind you.

Note: Instructors reserve the right to conduct an additional evaluation (e.g. oral/written exam) if any particular test score is dramatically inconsistent with other exam results or classroom performance. The goal is to make an accurate and fair assessment of a student's performance in this course.

Course Student Learning Objectives (SLO):

Upon satisfactory completion of this course, students should be able to:

1. Highlight the historical events associated with the field of microbiology and immunology. (Supports IGL 1, 3, 4, 7, 10; PLO 3)
2. Distinguish between prokaryotic and eukaryotic cells and understand the evolutionary relatedness of organisms. (Supports IGL 1, 3, 4, 7, 10, 11; PLO 1, 2, 3)
3. Develop a thorough understanding of the molecular structure, growth requirements and metabolic processes of various microorganisms. (Supports IGL 1, 2, 3, 4, 10, 11; PLO 1, 2, 3, 4)
4. Describe the impact of microbes in nature and society, the role of microbes in an ecosystem and human impact on the evolution of microorganisms. (Supports IGL 1, 2, 3, 4, 7, 9, 10, 11; PLO 1, 2, 3, 4)
5. Analyze the various immunological methods that hosts utilize to defend themselves from microorganisms and how these organisms can impact human homeostasis. (Supports IGL 1, 3, 4, 10, 11; PLO 1, 2, 3, 4)
6. Describe the methods available in controlling, preventing and treating infectious disease. (Supports IGL 1, 2, 3, 4, 10, 11; PLO 1, 2, 3, 4)
7. Develop microbiological laboratory skills in applying the scientific method of inquiry to gather and use information for the purposes of critical thinking, information analysis and problem solving in a microbiology laboratory. (Supports IGL 1, 2, 3, 4, 10, 11; PLO 1, 2, 4, 5)

Biology Program Learning Objectives (PLO):

PLO 1: Demonstrate understanding of the fundamental principles, concepts, and terminology of biology.
PLO 2: Explain structures and fundamental processes of life at molecular, cellular, and organismal levels.
PLO 3: View the living world with greater understanding, insight, and appreciation as it relates to the field of biology and contemporary problems and issues.
PLO 4: Demonstrate the ability to apply the scientific method of inquiry to gather and use information for the purposes of critical thinking, information analysis, and problem solving.
PLO 5: Exhibit proficiency in the laboratory and in the field by using standard equipment and measurement and observation techniques that allow one to gather, analyze, and interpret qualitative data.

Course Specific Institutional Goals (ILG):

ILG 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.
ILG 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
IGL 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
IGL 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
IGL 7. History. Students will understand historical events and movements in World, Western, non-Western, or American societies and assess their subsequent significance.
IGL 9. Ethical Reasoning and Action. Students will understand ethical frameworks, issues, and situations.
IGL 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
IGL 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Units of study in detail

Unit 1: Introduction to Microbiology [Supports SLO #1 ,2, 3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Explain the benefits of microorganisms to the environment and society
- Identify individuals who have contributed to the field of microbiology and immunology
- Classify living organisms based on their molecular and cellular characteristics
- Explore the various methods used to observe bacteria microscopically

Unit 2: Mycology [Supports SLO #2, 3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Characterize the organisms that make up the Fungi Kingdom and discuss their benefits to society
- Compare and contrast fungi to other types of microbes
- Understand the structural composition and growth requirements of yeast and molds
- Understand the effects of mycoses on the human body

Unit 3: Animal Parasites [Supports SLO #2, 3, 4, 5 6]

Learning Objectives

The student will be able to…

- Understand the characteristics of protozoa and their interactions with arthropod vectors
- Compare and contrast protozoa and helminths to other types of microbes
- Explain the features of parasitic helminths
- Understand the effects of protozoa and helminthic infections on the human body

Unit 4: Bacterial Structure and Physiology[Supports SLO #2, 3, 4, 6]

Learning Objectives

The student will be able to…

- Compare and contrast eukaryotic and prokaryotic cells
- Describe the morphological appearance of bacteria
- Explain the physical and chemical growth requirements of bacteria
- Demonstrate knowledge of binary fission and bacterial growth phases
- Compare and contrast methods by which bacteria can exchange genetic information

Unit 5: Virology [Supports SLO #1, 3, 4, 5,6]

Learning Objectives

The student will be able to…

- Explain the characteristics and requirements of viruses
- Compare and contrast bacteriophages with animal viruses
- Classify animal viruses based on their nucleic acid
- Describe prions and compare them to other organisms
- Explain the relationship between viruses and cancer

Unit 6: Bacterial Groups [Supports SLO #2, 3, 4, 6]

Learning Objectives

The student will be able to…

- Explain how bacteria are grouped based on their metabolic processes, biochemical characteristics and structural and morphological appearances
- Understand the benefits and detrimental effects of bacteria to the environment and society
- Explain their importance in various ecosystem

Unit 7: Applied Microbiology [Supports SLO #2, 3, 4, 5]

Learning Objectives

The student will be able to…

- Explore food preservation methods in preventing microbial spoilage
- Describe the use of microbes in the food industry and their industrial uses
- Examine the use of microbes in energy production
- Explain the role of microbes in genetic engineering and give examples of their applications in the medical and agricultural fields

Unit 8: Infection and Disease-An Introduction to Microbial Pathogenesis [Supports SLO #4, 5, 6]

Learning Objectives

The student will be able to…

- Understand the terms that are used to describe the types, occurrences and duration of infectious disease
- Investigate the methods infectious diseases are spread and their host-parasite relationships
- Describe a microbe's physiological features and metabolic reactions, including exoenzymes and toxins, that enables them to alter their pathogenicity

Unit 9: Resistance to Infection-Cellular Defenses [Supports SLO #4, 5, 6]

Learning Objectives

The student will be able to…

- Describe a host's first line of defense when combating an infection including both non-aggressive and aggressive measures
- Describe a host's second line of defense and differentiate between the various types of phagocytic cells
- Analyze the steps of an inflammatory response when combating an infection and the roll of various proteins and cells in the body

Unit 10: Immunology-Antibodies and Humoral Defense [Supports SLO #4, 5, 6]

Learning Objectives

The student will be able to…

- Compare and contrast cellular and humoral defenses
- Understand the difference between antigens and antibodies
- Characterize the five types of immunoglobulins and explain their molecular structure
- Analyze T and B lymphocytes and explain their role in immunological development
- Understand immunological disorders and the role of antibodies in tissue transplants and hypersensitivity reactions

Unit 11: Methods of Microbial Control-Preventing and Controlling Microbial Infections

***Learning Objectives* [Supports SLO #4, 5, 6]**

The student will be able to…

- Understand the various physical and chemical methods of microbial control
- Differentiate between antiseptics vs. disinfectants
- Explain the general principles of microbial chemotherapy and historical events surrounding antibiotic discoveries
- Describe the various mechanisms of action that anti-bacterial antibiotics exert on bacteria and the side effects of antibiotics
- Understand the general mechanisms of action that anti-fungal, anti-protozoan, anti-helminthic and anti-viral drugs exert on microbes
- Describe how drug resistance occurs and the dangers of antibiotic abuse globally

Unit 12: Microbial Diseases of the Skin, Eyes & Respiratory Tract [Supports SLO # 3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Understand the anatomy and the normal flora of the skin, eyes and upper/lower respiratory tract
- Describe the various bacterial, viral, fungal, and protozoan diseases of these areas and the methods used to treat and identify them

Unit 13: Microbial Diseases of the Digestive System [Supports SLO # 3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Understand the anatomy and normal flora of the digestive system
- Differentiate between an intoxication and infection
- Describe the various bacterial, viral, fungal, protozoan and helminthic diseases of this area and the methods used to treat and identify them

Unit 14:Microbial Diseases of the Urinary & Reproductive Systems [Supports SLO #3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Understand the anatomy and normal flora of the urinary and reproductive systems
- Describe the various bacterial, viral, fungal, and protozoan diseases associated with the urinary and reproductive systems and the methods used to treat and identify them
- Describe other sexually transmitted diseases including AIDS

Unit 15: Microbial Diseases of the Nervous & Cardiovascular Systems [Supports SLO # 3, 4, 5, 6]

Learning Objectives

The student will be able to…

- Understand the anatomy of the nervous and cardiovascular systems
- Describe the various bacterial, viral, fungal, protozoan and helminthic diseases associated with these systems and the methods used to treat and identify them

Laboratory Component: [Supports SLO # 3, 6]The laboratory exercises permit an understanding of techniques, reinforce certain lecture material and introduce concepts and material not presented in lecture.

Learning Objectives

The student will be able to…

- Conduct experiments independently as well as with others in the laboratory
- Master the necessary microbiological laboratory skills when applying the scientific method of inquiry
- Use critical thinking skills when gathering and analyzing information and problem solving in a microbiology laboratory
- Identify an unknown microorganism and present their findings orally and written

Fall 2025

BIO201 Lecture Schedule-Refer to Course Calendar on Blackboard

Note: Dates of Class Assignments/Exams will be announced in class and are found in the course calendar located in Blackboard. Schedule is subject to change at the discretion of the instructor.

Unit #	Week of:	Chapter(s)	Subject
1	9/2	1, 3, 10, 14	Introduction to Microbiology ***Class Assignment #1: Unit 1***
2	9/9	12, 21,22,24-26	Mycology ***Class Assignment #2: Unit 2***
3	9/16	12, 22-26	Animal Parasites: Protozoa & Helminths ***Class Assignment #3: Unit 3***
4	9/23 & 9/30	2, 4, 5, 6, 8	Bacterial Physiology, Structure, & Genetics ***Class Assignment #4: Unit 4*** **EXAM 1-Units 1, 2, 3**
5	9/30 & 10/7	13, 21-26	Virology ***Class Assignment #5: Unit 5***
6	10/7 & 10/14	11 & 27; Appendix E	Bacterial Groups ***Class Assignment #6: Unit 6***
7	10/14 & 10/21	9 & 28	Applied Microbiology & Biotechnology *No Class Assignment* **EXAM 2-Units 4, 5,6**
8	10/21 & 10/28	14, 15	Infection & Disease *No Class Assignment*
9	10/28*	16	Cellular Defenses: 1st & 2nd Lines of Defense *No Class Assignment*
10	10/28 & 11/4	17, 18, 19	Immunity: Humoral Defenses (3rd Line of Defense) Hypersensitivity & Serology ***Class Assignment #7: Unit 10 (I, II, III)*** **EXAM 3-Units 7,8,9,10 (I, II, III)**
11	11/4 & 11/11	7, 20	Control of Microbes *No Class Assignment*
12	11/11	21, 24	Diseases of the Skin, Eyes & Respiratory System ***Class Assignment 8: Units 11/12***

***Withdrawal Deadline: 10/31/25**

Unit #	Week of:	Chapter(s)	Subject
13	11/18**	25	Diseases of the Digestive System **EXAM 4-Units 10 (IV on), 11, 12**
14	11/18 & 12/2	26	Diseases of the Urinary/Reproductive Systems ***Class Assignment 9: Units 13/14***
15	12/9	22, 23	Diseases of the Nervous & Cardiovascular Systems ***Class Assignment 10: Unit 15*** **Exam 5-Units1-15 (Cumulative-100 Ques.)** **Final Exam Period (12/15-12/19/25)**

****Thanksgiving Recess: Tues 11/25-Fri. 11/28/25 No MCCC Classes held**

Mastering Microbiology* Website: *Optional

The textbook publisher has a comprehensive tutorial and review tool that provides students with a wide variety of activities for every chapter in the textbook. These activities are **not required** for the course. The access code for this site is included with the new edition of the text. If it's not included or if you have an older version of the text and would like to purchase access to the site go to http://www.masteringmicrobiology.com/.

Microbiology Resources:

The following websites might be of interest to you: www.sciencenews.org , www.sciencedaily.com www.cdc.gov (Centers for Disease Control), and www.asm.org (American Society of Microbiology; podcasts available)

Lecture Exam Dates: Tentative Dates (subject to change by the instructor)

Exams 1-4 (50 Ques.) will be **given in class (60 minute limit).** Exam 5 (100 Ques.) will be given in class during the Final Exam Period (12/15-12/19/25) with a 2 hour time limit. Refer to the course website **http://www.mccc.edu/~hilkerd** for Exam 5 times for each lecture section

Exam #1 **Units 1,2,3-Week of 9/23/25**
Exam #2 **Units 4,5,6-Week of 10/21/25**
Exam #3 **Units 7,8,9,10 (I, II, III)-Week of 11/4/25**
Exam #4 **Units 10 (IV on),11,12-Week of 11/18/25**
Exam #5 **Units 1-15 (**50 Ques. Units 13,14,15 & 50 Ques. Units 1-12**)-Week of 12/15-12/19/25 (To be announced in class)**

RELIGIOUS/CULTURAL OBSERVANCE

Cultural and religious holidays are important to many individuals. Students who anticipate a conflict between a class session and a religious or cultural observance should notify the instructor in writing of any rescheduling needs by the deadline provided by the instructor, or if no deadline is specified at least two weeks prior to the observance.

STATEMENT ON COMMUNITY AND BELONGING

Mercer County Community College (MCCC) is committed to serving its students and adapting to change. The college supports learning environments where *all* students are encouraged to engage fully. If any aspect of the course structure or instruction presents a barrier to your participation, please inform the instructor promptly

ACCESSIBILITY AND ACADEMIC ACCOMMODATIONS

Mercer County Community College recognizes disability as an aspect of diversity. This class has been designed to meet the diverse needs of all learners. Please feel free to schedule an appointment with me to discuss your unique learning needs.

If you feel that you will require academic accommodations, please email Arlene Stinson stinsona@mccc.edu or the Center for Accessibility Resources CAR@mccc.edu . You can also check out the Center for Accessibility Resources on the web for comprehensive information on the process for obtaining academic accommodations at Mercer County Community College. https://www.mccc.edu/student_services_needs.shtml

FINANCIAL AID

It is recommended that students complete an application for financial aid to determine eligibility for financial assistance. The application is FREE. Visit www.studentaid.gov to complete your application. Students who are interested in MCCC Foundation scholarships are expected to complete an application as well.

Fall 2025
BIO 201 LABORATORY SCHEDULE

Disposable gloves MUST be brought to ALL labs. Closed-toed shoes are highly recommended.

Week of:	Laboratory	Experiments	Topics
9/2	1	1, 2, 3	Introduction to Light Microscopes Survey of Microbes Collecting Microbes
9/9	2	3	Mold Identification Isolation Techniques
9/16	3	4	Staining Techniques
9/23	4	5 6	Culture Media Pour Plate Techniques
9/30	5	7 8	Temp. vs. Growth Temp. vs. Survival
10/7	6	9 10 11 12	pH Osmotic Pressure Ultraviolet Light Anaerobic Techniques
10/14	7	23 24 25	Transformation Latex Agglutination Parasitology
10/21	8	13 14 17 18	Antimicrobial Agents Antibiotics Skin Microbes Throat Cultures
10/28*	9	17-18 19 20	ID Skin & Throat Microbes Water Analysis for Contamination Water Microbes
11/4	10	15	Biochemical Reactions

***Withdrawal Deadline: 10/31/25**

Week of:	Laboratory	Experiments	Topics
11/11	11	15 16	Biochemical Reactions Unknown Identification
11/18*	12	16	Unknown Identification
12/2	13	16	Unknown Identification

***Thanksgiving Recess: Tues 11/25-Fri. 11/28/25 No MCCC Classes held**

Laboratory classes will end on Friday 12/5/25

Students may keep track of their progress in this class by recording their results on this page.
Lecture:

Exam #1: _____
Exam #2: _____
Exam #3: _____
Exam #4: _____
Exam #5: _____

Laboratory:

Quiz #1: _____
Quiz #2: _____
Quiz #3: _____
Quiz #4: _____
Quiz #5: _____
Quiz #6: _____

Quiz#7:_____
Quiz#8:_____
Quiz#9:_____
Quiz#10:_____
Quiz#11:_____

Unknown ID:_____

Class Assignments: Maximum of 100 points

#1 _____ #4 _____ #7 _____ #10 _____
#2 _____ #5 _____ #8 _____
#3 _____ #6 _____ #9 _____

Withdrawal Deadline: 10/31/25